

MECH 4420: Vehicle Dynamics
Spring 2012
MW 3-4:15 (make-ups on F 3-4:15)

Instructor: Dr. David M. Bevly

Phone: 844-3446

Office Hours: MW 11-3 (Wiggins 2418F)

Class Website: <http://eng.auburn.edu/~dmbevly/mech4420/>

Textbook: Gillespie, "Fundamentals of Vehicle Dynamics," Third Edition, Prentice Hall Publishing, 1998 (available at the bookstore or at <http://www.sae.org>)

OR

Miliken and Miliken, "Race Car Vehicle Dynamics," SAE, 1995.
(available at <http://www.sae.org> and on reserve in the Library)

Supplemental References: Bosch Automotive Handbook, 4th Edition
Dixon, "Tires, Suspension and Handling
Matlab Reference Guide

Car Talk with Tom and Ray Magliozzi
WTJB, 91.7 FM, Columbus (Sat 10 am, Sun 6 pm)
<http://cartalk.cars.com>

The Garage section at <http://www.nascar.com>

Matlab Help located at:
http://www.eng.auburn.edu/departement/ee/pages/comp_tools.html

Pre-Requisites: MECH 2120 (Dynamics)

Strongly Recommended Pre-Requisite: MECH 3140 (Systems & Controls), Matlab

Grading Policy:

Exam(s)	20
Homework	40
Labs	15
Project	25
Total	100

HW Grades:

A lottery will be held where students must come explain their m-code. Additionally short homework quizzes may be given to validate your understanding of the homework assignments. Homework grades will be determined as follows:

$$\text{Grade} = (\text{hw_grade}/2) * (1 + \text{hw_quiz}/10)$$

Scale:

90-100 - A	70-79 - C
80-89 - B	60-69 - D
Below 60 - F	

Tentative Lecture Topic Outline (Subject to Change):

<u>Week</u>	<u>Topic</u>
1	Review of System Dynamics
2	Tire Mechanics
3	Longitudinal Dynamics (Acceleration, Braking, ABS)
4	Steady Handling
5	Transient and Limit Handling
6	Stability Control
7	Suspensions
8	Suspension Design
9	Roll and Roll Over
10	Steering and Steering Control
11	2 DOF Dynamics/Vibrations
12	Ride Quality
13	Active Suspensions
14	Multi-Body Dynamics
15	Vehicle Control

General Policies

Class attendance is expected but not *formally* recorded. Late submission of assigned work or make-up examinations will be allowed if and only if accompanied by an approved University excuse. Additionally, I expect a very high standard of honesty among students at Auburn University as I feel that engineers with moral integrity is of the utmost importance in society. Because of the importance of academic honesty to the reputation of Auburn Engineers, I will report violations of academic honesty as outlined in the Auburn Tiger Cub.

Accessibility

It is the policy of Auburn University to provide accessibility to its programs and activities, and reasonable accommodations for persons defined as having a disability under Section 504 of the rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act of 1990. Students who need special accommodations should make an appointment to see the instructor as soon as possible or contact The Student with Disabilities Program office at (334) 844-5943 (Voice/TT)